



EBFMtuna - 2012

Towards ecosystem-based management of tuna fisheries

Evolution Of Radiobuoys Technology For FADs

Past, Present and Future

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Beginnings



Tuna seiner fleet started using FADs

Need of tracking FADs at sea





1st Generation

marine
instruments



SELCALL BUOYS

Goniometric reception

Only radio direction

Limited range coverage <500nm

Very extended over the world

No airtime cost

Up to date in longliners





1st Generation

marine
instruments

Main manufactures:



MARINE COMMUNICATIONS
RYOKUSEISHA CORPORATION

中短波帯セルコールブイ

型式名: SV-CS50 (認証番号: 0010YAA1020・認証年月日: 平成18年6月14日)

型式名: SV-CM50 (認証番号: 0010YAA1019・認証年月日: 平成18年6月14日)

- 安定性が良く、取扱いが容易です。
- アンテナ上部には、編結線を内蔵し、電波放射効率を向上しました。
- 電子オートキーの採用により、無接点となり動作が確実です。
- 各プリント板は、実装のまま、保守点検が容易です。



2nd Generation



First **SOUNDER BUOY**

SelCall with a fish finder inside

Reception by **Meteo Fax**

Long transmission time

Limited range

MARINE COMMUNICATIONS
RYOKUSEISHA CORPORATION



Good operation



Easy radio detectable



No commercial success



High cost

3rd Generation



ARGOS SATELLITE BUOY



Worldwide Coverage.



airtime communications costs.



Argos Network not optimized for tuna radio buoys.



UHF radio messages every 90 seconds.
Communications intercepted with radio directional finder.
Buoys stolen.



No success in tuna fleets.

4th Generation



GPS RADIO BUOY



MARINE COMMUNICATIONS
RYOKUSEISHA CORPORATION

SelCall Radio Buoy

Manually radio operated





4th Generation

marine
instruments


SERPE-IESM



HF Radio buoy.

Automatic Transmissions every hour.

Water temperature, Battery level.

Range over 1000 nm.

Frequency change. No interceptions.

Automatic reception onboard.

PC software managing the radio receiver.

Reception of every buoy 24 times a day.



Observation of real currents.



Automatic reception.



3 Oceans

90% European fleets

5th Generation



SOLAR SATELLITE BUOY

ZUNIBAL 



inmarsat 



Solar Buoy 



Inmarsat Satellite.



Multibeam Echosounder.



Young company. Big challenge. Technical difficulties at sea.



5th Generation

marine
instruments



Two new manufactures:



HF GPS Radio Buys
Satellite Radio Buys



Satellite Inmarsat D+ Radio Buys
Battery energy





5th Generation

marine
instruments



First radio buoys with reliable echosounder informations..
No surprise, detection of fish in advance.



Large fuel savings



M3i Blue Buoy



Own 50KHz echosounder



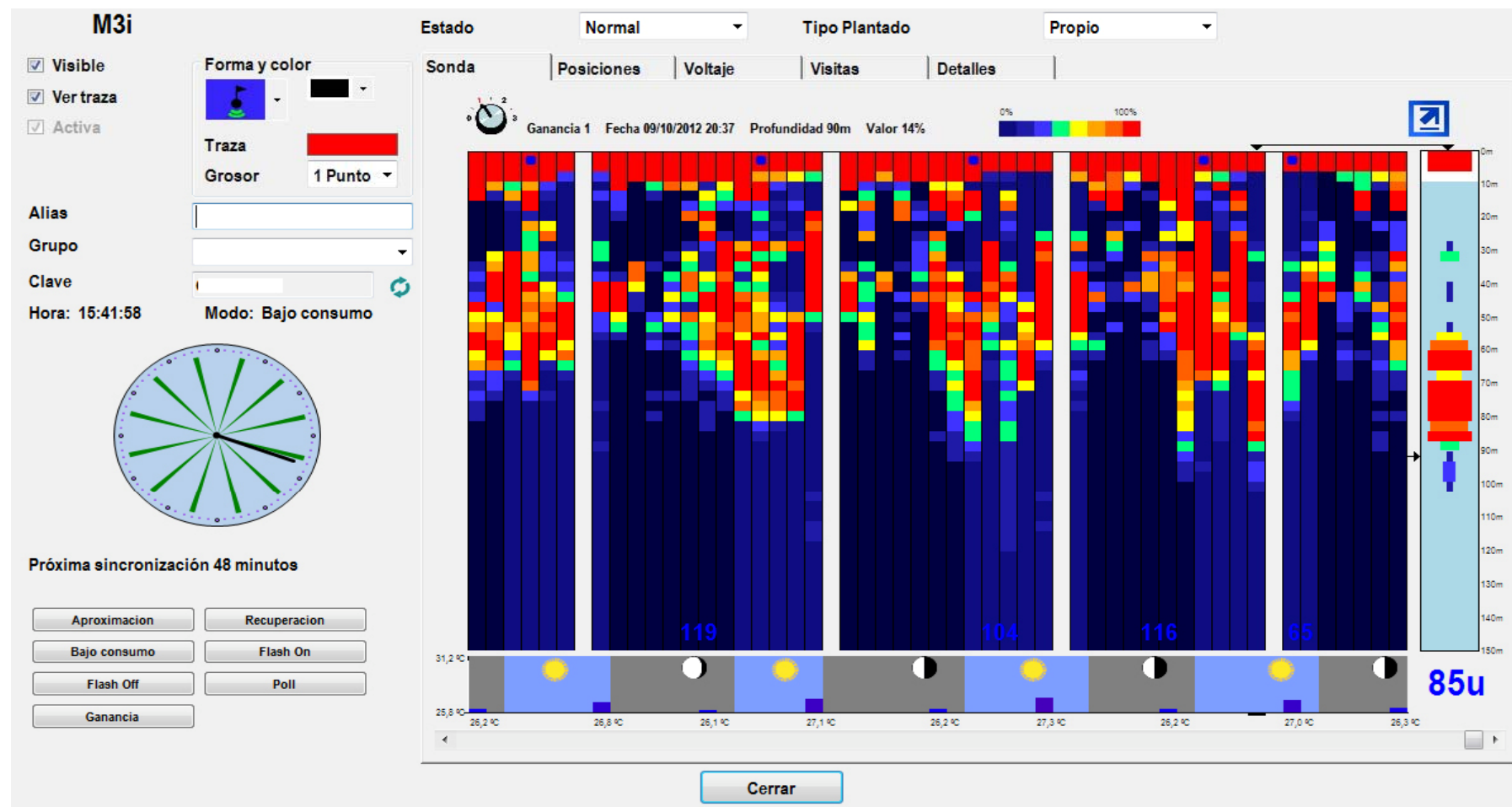
Simrad 190KHz echosounder





M3i Buoy

marine
instruments





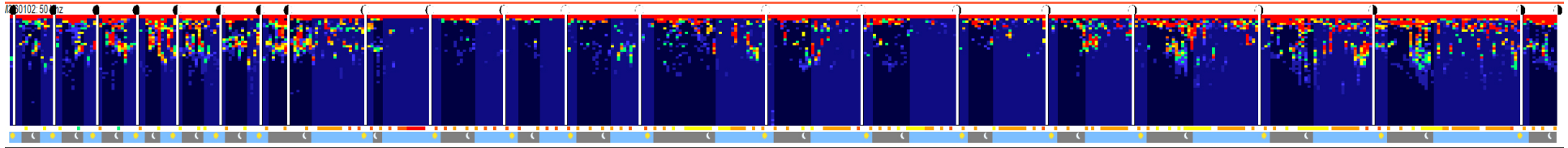
M3i Buoy

marine
instruments

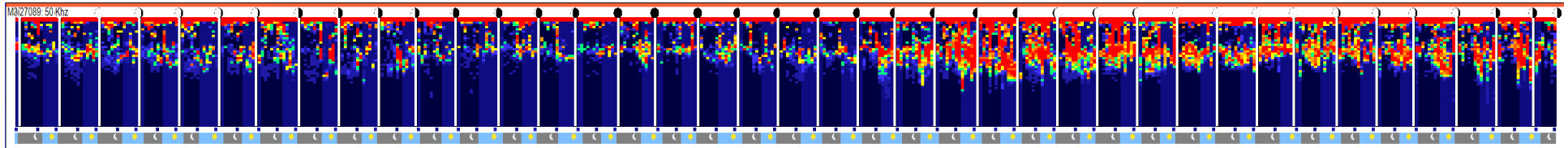


Pacific Ocean

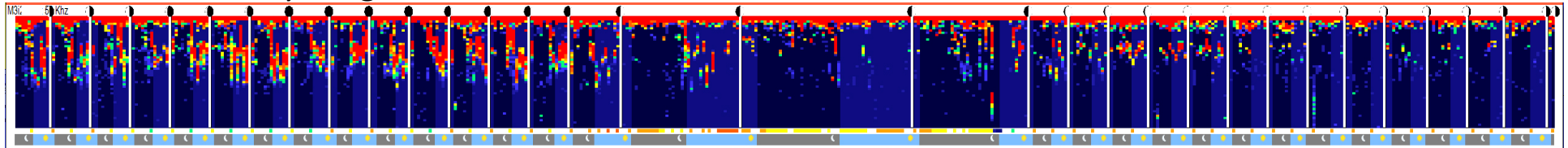
Telecommands



Evolution of fish below the FAD



Probably caught





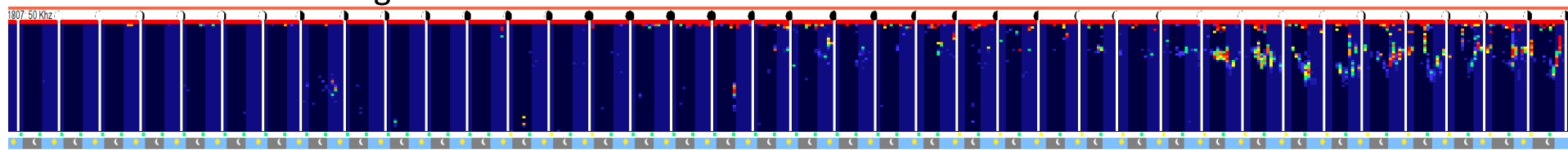
M3i Buoy

marine
instruments

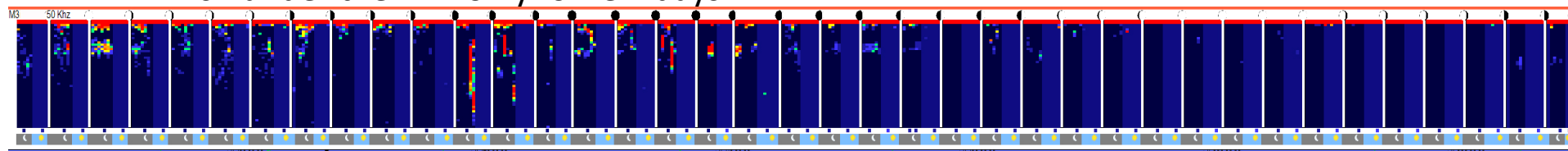


Pacific Ocean

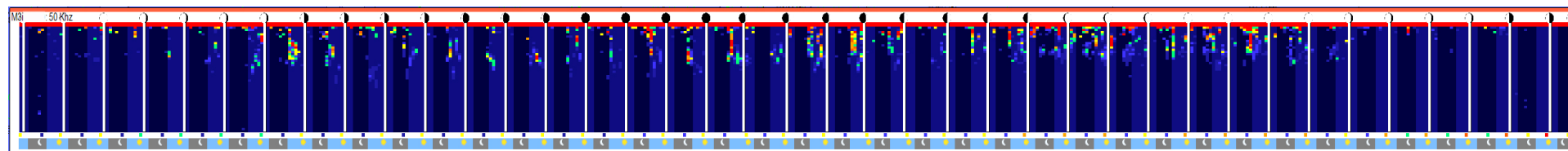
Fish is coming



Fish under the FAD only for few days



Small fish shoal





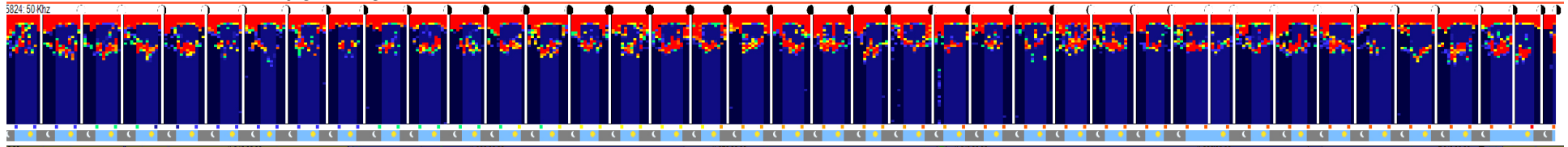
M3i Buoy

marine
instruments

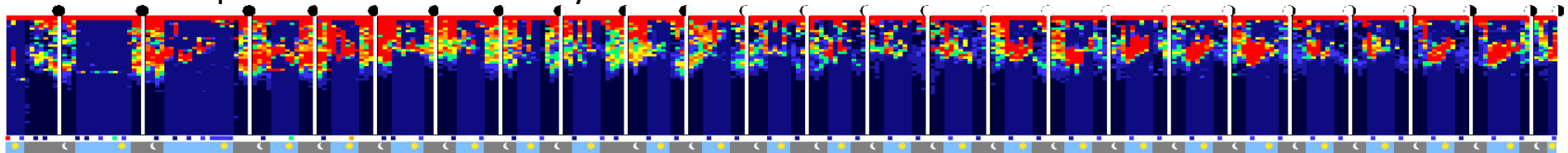


Atlantic Ocean

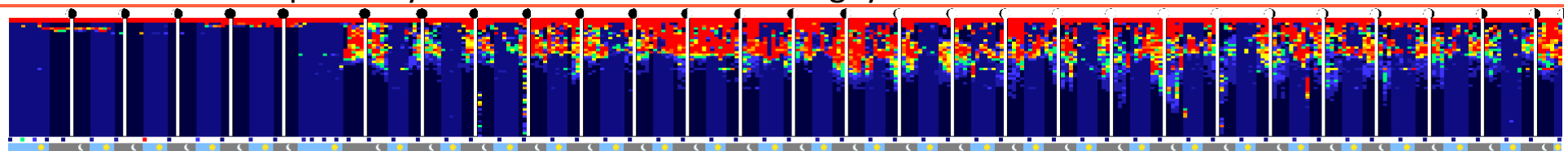
Fish very *faithful* to the FAD



First plankton... After few days nice fish shoal



A shoal probably with some detections of Bigeye

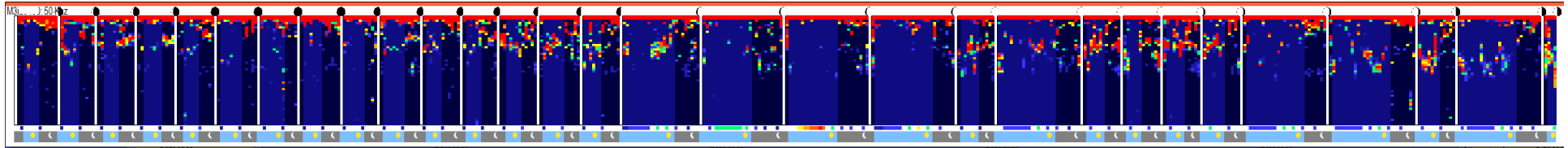


M3i Buoy



Indian Ocean

Telecommands



M3i ACHIEVEMENTS :

- 1) Good idea of the size of the school.
- 2) Drastically reduction of the CO2 emission tons per tuna catch tons

The M3i can't help you to discriminate species



6th Generation

marine
instruments



Tri-frequency sounder buoy: 50KHz, 120 KHz and 200KHz.



M4i Buoy



New concepts: Different frequencies, aperture angle of transducer.

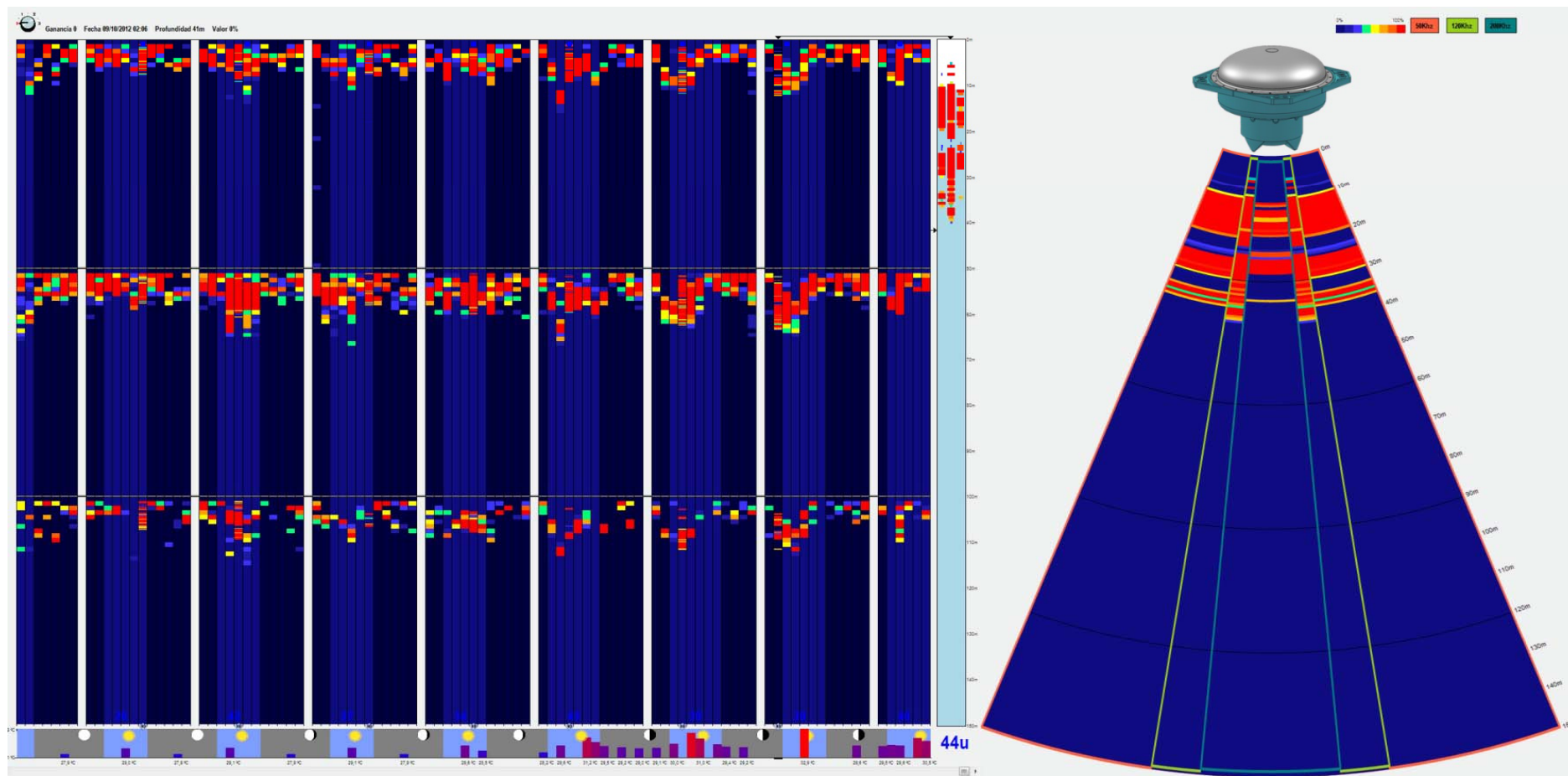
Not only presence or absence of fish and quantities.

The way to discriminate species by acoustic signatures.



M4i Buoy

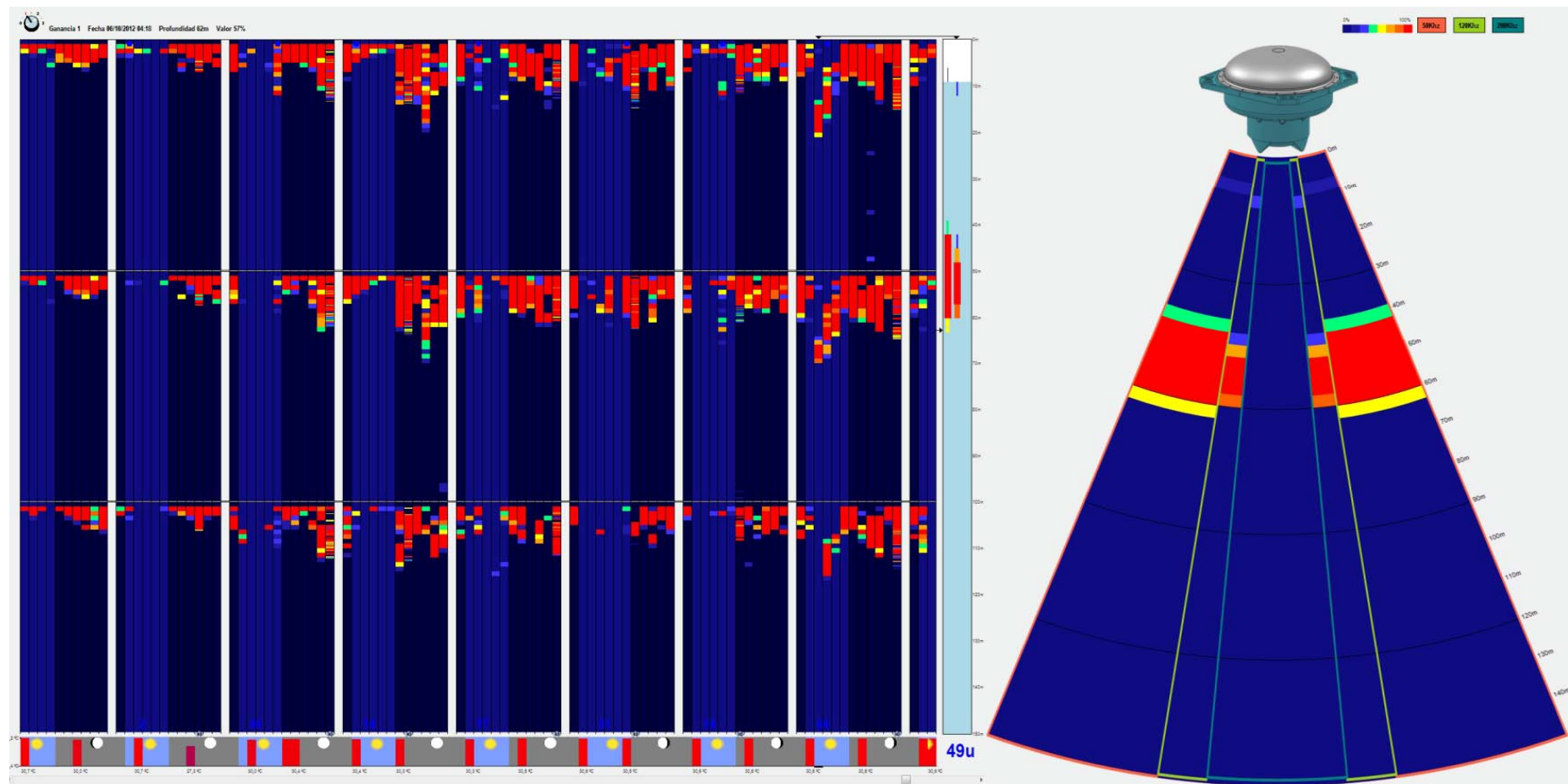
marine
instruments





M4i Buoy

marine
instruments

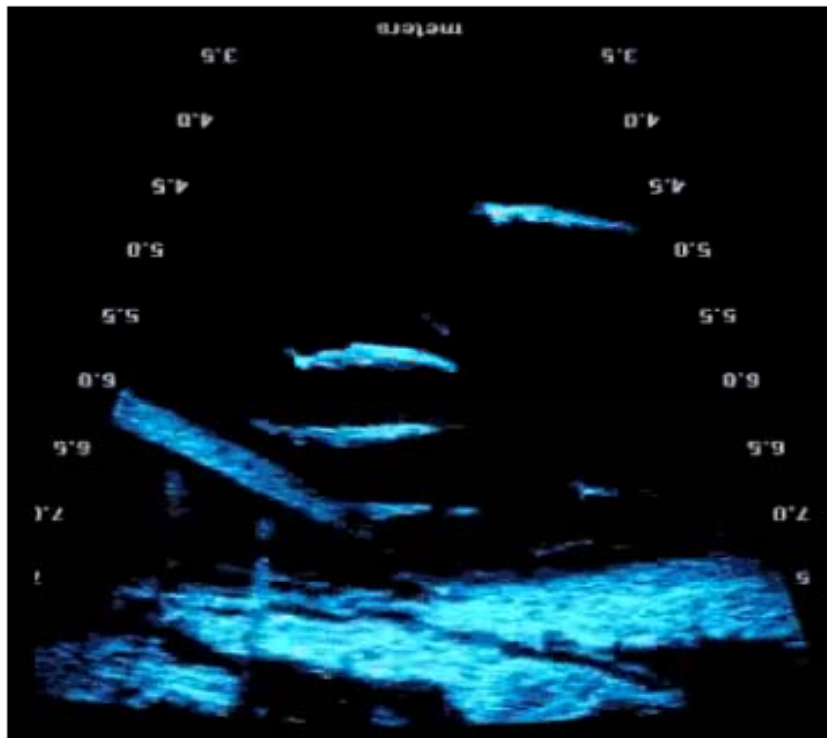




What we need? Where are we going?



Discrimination sizes and species with high technology sonar?



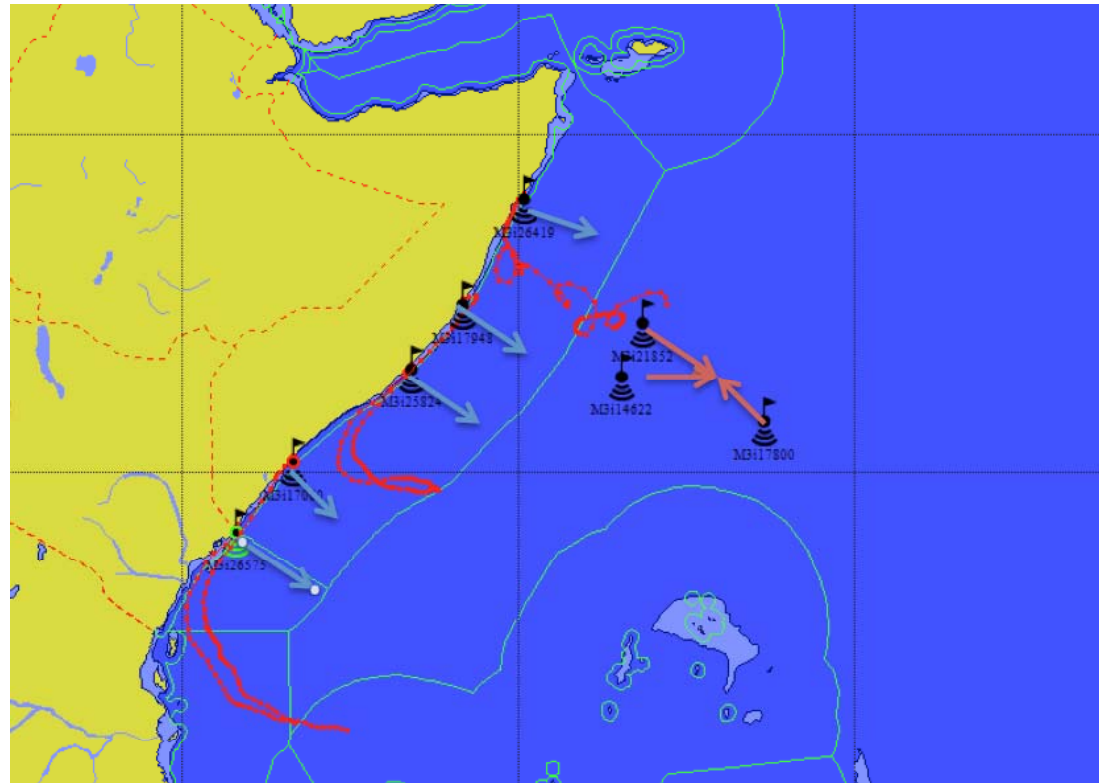
The intensity of the echo received is not more the size of the fish !!



What we need? Where are we going?



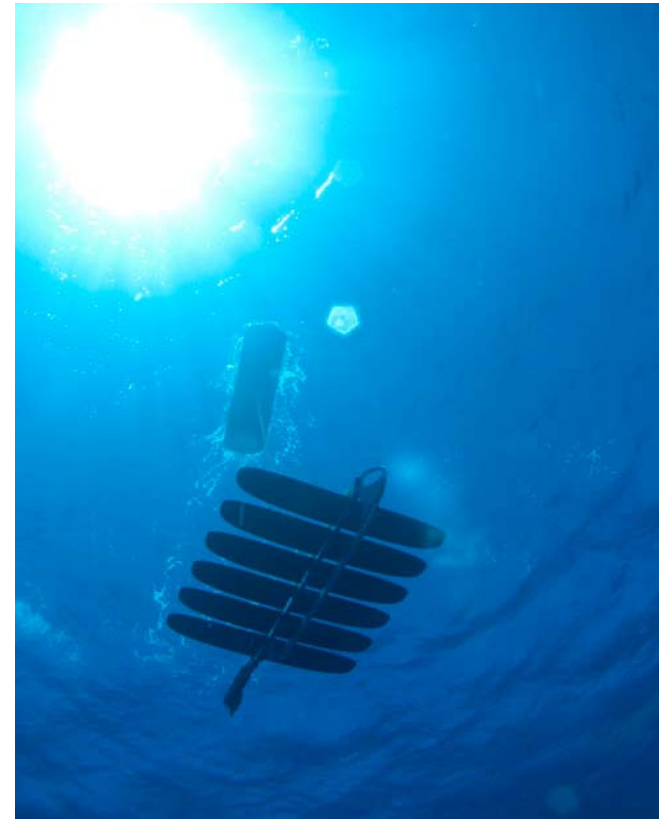
FADs that can be driven away from the coast? Driven to a meeting point? To a different current ?





What we need? Where are we going?

marine
instruments





What we need? Where are we going?

marine
instruments

We need to have a right management of the resource in the oceans

Electronic instruments manufacturers →

Help the scientist to observe.

Help fishers to work in the best ecological and sustainable way.

MERCI POUR VOTRE ATTENTION !!